

Claims

Claim 1. What is claimed is: A totally integrated system for automatic formation flight control of multiple vehicles not limited to aircraft, helicopters, or space platforms said system comprising of:

- an automatic flight control system with processor located on the vehicle to enable communications and control to any number of aircraft in formation flight;

- a communications transceiver located on the vehicle that provides discrete communication links to any number of aircraft in formation flight;

- an aircraft communications bus protocols and message packet structure that provides exchange of information from multiple aircraft in formation flight;

- an encrypted method of communications exchange between any number of aircraft in formation flight;

- a method of providing a computed "formation zone" (FZ) that provides elemental positional information for multiple aircraft in formation flight;

- a method of selecting both formation flight pattern and spatial clearance between multiple aircraft in formation flight;

- a method of providing "real-time" display of aircraft and positions of multiple aircraft in formation flight;

- a method of providing a "buffer zone" with a "relative formation point" (RFP) for any number of aircraft in formation flight;

- a method of polling all aircraft in formation flight for positional information;

- a method of providing flight guidance including autopilot inputs to multiple

aircraft in formation flight;

a method of providing "dampening" of the flight profile to multiple aircraft in formation flight;

a totally integrated system to provide control of any number of aircraft in formation flight; and

an autopilot located on the vehicle capable of receiving and transmitting inputs/outputs from the vehicle communications bus.

Claim 2. What is claimed is : a process for automatic formation flight control of vehicles as claimed in Claim 1 not limited to aircraft, helicopters, or space platforms further comprising the steps of:

a flight control system with processor located on the vehicle according to Claim 1, said processor to enable communications and control to any number of aircraft in formation flight and calculate the formation zone (FZ) and (RFP) relative formation point and initiate exchange of similar information between multiple vehicles in order to prevent mid-air collision of multiple vehicles under AFFCS control.

a communications transceiver located on the vehicle that provides discrete communication links to any number of aircraft in formation flight;

a aircraft communications bus protocols and message packet structure that provides exchange of information from multiple aircraft in formation flight;

an encrypted method of communications exchange between any number of aircraft in formation flight;

a method of providing a computed "formation zone" (FZ) that provides

of speed (IAS), position (Latitude and Longitude provided by GPS), altitude provided by radio altimeter correlated with pressure altimeter plus predetermined distance from wing tip of formation vehicle and a "buffer zone" with the RFP calculated being comprised of a composite of the nearest four corners of the FZ and the center point of the FZ (Figure 2).

- a method of selecting both formation flight pattern and spatial clearance between any number of aircraft in formation flight;

- a method of providing "real-time" display of aircraft and positions of multiple aircraft in formation flight;

- a method of providing a "buffer zone" with a "relative formation point" (RFP) for each aircraft in formation flight;

- a method of polling all aircraft in formation flight for positional information;

- a method of providing flight guidance including autopilot inputs to any number of aircraft in formation flight;

- a method of providing "dampening" of the flight profile to multiple aircraft in formation flight;

- a totally integrated system to provide control of any number of aircraft in formation flight; and

- an autopilot located on the vehicle capable of receiving inputs from the vehicle communications bus.